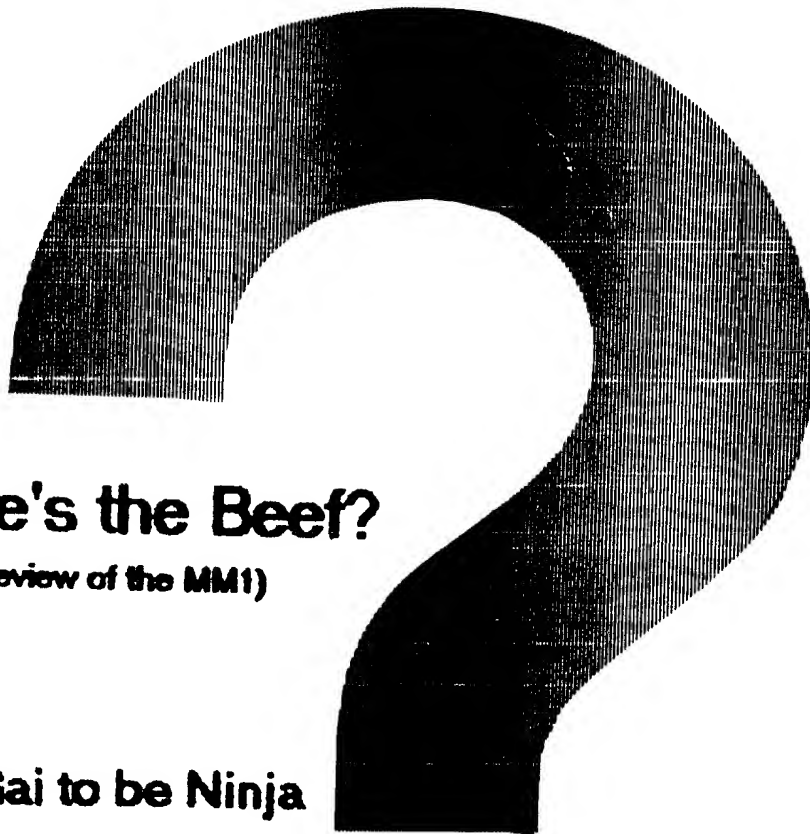


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**Issue #5**

# **THE OSK'ER.**

**News and Views in the World of OS9/68000 and 6809**



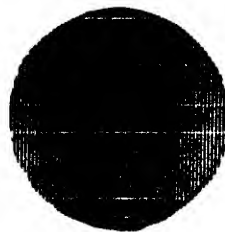
**Where's the Beef?**

**(a review of the MM1)**

**Kyum-Gai to be Ninja**

**Introduction to  
Basic09 Cont'd**

**Snail Trails**



# the OSKer

Issue #5

Review: the MM1 .....	3
Paul Ward and IMS .....	6
Review: Kyum-Gal to be Ninja .....	7
Rainbowfest '91 .....	8
Flame On .....	10
Introduction to BASIC09 Cont'd.....	13
Snail Trails .....	15
Rainbowfest cont'd .....	15
Ramble On .....	18

'the OSKer' is published monthly or as possible by StG Computers inc., P.O. Box 24285, Speedway, IN 46224. The president and editor is Scott Griepentrog, Secretary and sometimes columnist Chris Swierchuth, and treasurer Dave Henk. The position of V.P. is currently open. Hardware assisting with the production of this issue was provided by Doug Dalton.

Subscriptions to the OSKer are \$12 within the U.S., \$15 for Canada, and \$20 elsewhere and overseas. To begin a new subscription with a particular back issue, specify which one when writing. Back issue requests will be filled as long as supply lasts. Out of print issues (currently only issue #1) will be available for sale at a future date.

Editing is done under OSK on a prototype MM1 using eMacs and also on a Tandy Model 102 Portable. Formatting and layout are done with Word for Windows on a 386 machine (gasp, cough). Initial copy printed on a Panasonic KX-P1624 24-pin or an Alps Allegro 500 24 pin, both using Epson LQ2550 emulation. The magazine is printed using the offset process.

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The cover artwork was done by Alan Shettra.

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## Review: the MM1

by Scott Griepentrog

Starting our review series (next month will be TomCat models, then the System 4) is the Multi-Media 1 (MM1) from Interactive Media Systems (IMS). The order in which I am going through these machines is actually 100% backwards from the order in which they have become available, and I apologize to Frank Hogg and Ed Gresick for not getting to them first. But then, look at it this way guys: you get a month or two extra to get ready. I'll even bet Paul will wish I had put him last after he finishes reading this review.

The president of IMS is, of course, the irascible Paul Ward. While I was in Washington D.C. last month on other business, I dropped in on his office. He runs IMS from his home in a quaint old building just north of our nation's capitol. I will admit that I was a bit surprised by this, knowing that he has several people employed to assist him. But I realized that he is (hopefully) spending money where it will do the most good - on the machine itself, not on expensive office space. And as a newly formed business (IMS was originally KLE, which started in '87 selling OS9 utils & manuals), one can expect this sort of thing. As a comparison, my own company was actually started earlier and has only moved into a 'real' office a few months ago. Not that I've spent much time in it. But I digress...

This article was to have been a complete review of the MM1. Although I do have detailed information about the hardware itself and will be covering that today, I have not yet received copies of any of the latest software such as what I saw being demonstrated at Rainbowfest. This includes the latest version of Kevin Darling's windows that is (more or less?) CoCo-compatible, and the demonstration programs they were showing then.

And just what would keep our friend Mr. Paul Ward from giving me a copy of the very impressive stuff he was demonstrating at the show? I have no idea, but it gives me a great cause for concern. When I was at the fest he said he would get the latest stuff to me there. Realizing how busy he was I offered to stop in to see him in Washington in a few days, as my schedule was taking me there anyway. And when I did, the disks had supposedly been sent to North Carolina (where Kevin Darling is), and he promised to mail them to me. A couple of weeks later I called him up to ask where they were. He claimed to have been too busy to get them to me, but yet he had taken the time to type up

a response for the Flame\_ON article (in this issue).

Let me first review of what has happened in the past year with the MM1. My first sight of an MM1 was at the Rainbowfest '90 in Chicago. The unit was a single board, slightly smaller than the current size. As what seemed to be the best design and SEEMED to be the best organized company then, we (StG inc - the OSKer started a few months later) bought the first and only ?available demo unit at the time. Our Mr. Ward was promising to have the second board (i/o and scsi) ready in a couple of months. It was November before I received the system I have now - both boards, a little longer than the original design (the other unit was shipped off to another developer that had been paid and waiting since the fest).

Although this new(er) one has both boards, it is an early test run and several changes have been made since. The software I received then was functional - OSK version 2.3 (2.4 is now out), a VERY early version of Kevin Darling's Windows (no CoCo support, no documentation on using the graphics), and a few demo programs, few of which worked. A couple of months later Paul sent me some additional demo's, but those that worked were not at all impressive.

So my opinion of the MM1 going into Rainbowfest '91 last month was understandably dismal. But when I got there and saw the latest version of KD's Windows with CoCo compatible graphics and really snazzy simultaneous animation and sound demo's, I was very impressed with what had been accomplished all those months of fretting. I thought, "Hey, this might work out afterall". So Paul Ward agreed to get me a copy of 'practically everything so I could do this long awaited review of his machine - and what do I get? Squat.

Come to think of it, I saw some really neat demo's back at the Atlanta Fest in October '90 too - but haven't received copies of any of those either. Is there some method to this madness? Is there some other machine hiding under the table when they're showing off demos? Just what the heck is going on here?

Well, I happen to know that it is actually an MM1 that is doing these demo's, but if I didn't know better that's what I would be wondering given the effort that has been put into making things available. Especially to someone like myself who is going to give them either good or bad press depending on

whether or not it works. Maybe that's it - it doesn't work yet, and they're waiting until it does before letting anybody look at it? But these demo's do work - or at least on their machines. And from what I understand other developers have already been given the same disks I am waiting for.

So, as IMS is obviously reluctant to let me examine their software, I have to resort to covering the hardware as it exists currently, and figure on another review in three months or so (after I get through the other machines). Maybe they'll have something ready by then. I'm not holding my breath anymore. But I did come by an appropriate nickname for Paul's computer: the Mickey Mouse One.

Am I being too harsh on Paul and his organization? Maybe. But I think he has deserved a certain amount of criticism. Especially considering the numbers of once OS9 enthusiasts that have bought other machines because of his continually unfulfilled promises. He needs to learn his lesson, and if by pointing out his faults in this article I can bring about some amount of change (however small) for the better, then I have succeeded. However, if you are one of the unlucky who have been waiting for this machine to become available, please don't consider the MM1 dead yet. And most certainly, don't give up OS9! If you can't wait, check out one of the other systems. But I should point out that the MM1, when it arrives, will have been worth the wait. It is a phenomenal system, at an unbelievable price.

### THE HARDWARE

First I should state that the unit I have is an late-early prototype, and that some things have changed since this design. I believe I am aware of everything that has changed since, and so everything here should be correct. Mr. Ward has told me that he will replace this unit with a newer full production model when he gets a chance, and at that point I will make sure of my facts.

There are two boards to a full MM1 - if you purchase only the single board it is called a Personal MM1 and does not have the SCSI port, Parallel ports, extra serial ports, sound I/O, Joystick, and other goodies that are found only on the second (called the 'I/O') board. The two boards are interconnected via a 'backplane' board that has the power connector and two bus connectors on it.

Both boards are 8.25 inches by 4 inches, with an additional inch or so necessary for the backplane board and connector

clearance. The unit comes mounted in a PC style 'skinny' case, which is 15.5" X 16" X 4.25" (including the rubber feet). There is space to mount two 3.5" half height drives and two 5.25" half height drives. It also comes with a 200 watt power supply and the usual assortment of power, turbo, and hard drive lights and buttons on the front panel.

The main board has (of course) the SCC68070 CPU on it. It has 16 data and 23 address lines (24 if you count LDS/UDS). It also has a serial interface, which is used for the T0 port. My experience with this port has shown that there is a problem which causes extra characters to be output after a certain amount of usage. According to Kevin Pease, the main designer of the MM1, this is due to a bug in the 68070 chip itself.

The other really large component on the main board is the VSC chip (actually SCC66470, which is a 120 pin surface mount device). This chip handles display generation and has several special graphics functions, including compression and decompression of images. It also controls access to and refresh of the 1 Meg of ram on the board, which is a bank of eight 4-bit by 256K chips.

The VSC has certain limitations in its resolution, however. At 256 colors, the maximum screen size is 320 x 210, 320 x 420 interlaced, or 320 x 480 with overscan. The maximum at 16 colors only goes up to 640 x 210, 640 x 420 interlaced, and 720 x 480 with overscan. This is a far cry from the current super VGA displays which are a must on PC's - 1024 x 768 in 256 colors.

The color output of the VSC chip is connected to a B4478 palette controller. The function of this chip is to output the requested level of Red, Green, and Blue to the monitor for each of 256 colors.

The analog RGB connector has been changed from the initial design of a 10-pin header compatible with the CoCo, to a 9 pin DB9 compatible with certain PC monitors.

The pinout is:

PIN	FUNCTION
1	Ground
2	Ground
3	Red
4	Green
5	Blue
6	Not used Intensity in CGA
7	Not used, but has connector for sound input
8	Horz Sync
9	Vert Sync

It is interesting to compare this to the pinout of the 10-pin header used in CoCo monitors, because numerically it is the same. The designers of the CoCo3 actually borrowed the CGA (RGBI) pinout to create their

connection. This means that it is easy to create an adapter cable to allow CM-8 and other monitors to be used with the MM1. At the same time, most CGA monitors can be plugged in as is and will work, although only with 8 colors. I would credit IMS with this, but I gave them the idea (I've been using CGA monitors with my CoCos for years). But I do credit them with the sense to change from that awkward 10-pin header at the last minute.

The ROM on the main board consists of two 64k chips in parallel. That is, two are used to fill in the full 16 bits of the data bus, making a total of 128k. This rom contains the OSK bootstrap code, in addition to some program modules. By loading commonly used modules into the ROM, RAM space is conserved. And OSK allows for these to be replaced by loading a module with a higher revision level, so they are not permanent. If the MM1 board wasn't so cramped for space, an extra set of ROM sockets would be nice to allow users to add their own rom'd modules. But replacing the existing roms isn't that difficult (they are socketed) and 128k is a lot to play with.

The floppy controller is the WD37C65, capable of practically any format including the common 1.44 Meg. The 34 pin connector is standard, allowing use of most any drive, and the select signals 0 through 3 are wired to allow use of up to three double sided units. However, I have experienced some difficulty with both MM1 units I have tried out. There appears to be a problem with these drive select signals because I have noticed that the indicator lights on both my drives will glow dimly - until one is used at which point only the one selected is on. I have also had some difficulty reading disks that were created using another machine, as well as even ones created on the MM1 itself sometimes. I have reported these problems to Paul, but he claims not to have noticed them himself. Hopefully this problem will not occur with the production units.

There are two serial ports on the main board, T0 and T1. The T0 port, as I mentioned before, is driven by the 68070 CPU itself and a MAX233 chip (used to buffer the RS232 signal levels, which are +/- 12v where the only supply voltage is +5v), and has a DB9 connector mounted on the board. This port has only the transmit, receive, CD and DTR signals available. The MAX233 chip can only handle 4 lines (2 in, 2 out), and the handshaking signals are not wired. What is worse is that they are not tied high, making it necessary to create a custom cable for use with any device that does not ignore the handshaking signals (RTS, CTS, and DSR). Instead, these signals should be connected to +5v on the

board itself, allowing any PC style DB9 to DB25 adapter to work with any device.

The T1 port uses a MC68901 serial controller chip, with its four signals being tied to a connector for an optional daughter board with an RS232 or MIDI driver and connector on it. Other than the usual transmit and receive signals, this port has transmit and receive clock signals, which are used in synchronous communications (not commonly used in personal computers). This port has no CD, DTR, or handshake connections whatsoever, so it is better to use for MIDI or some other device that doesn't care. But it does have a very nice feature - a jumper selectable clock for MIDI or RS232, making it easy to switch from one to the other.

A feature which has been added after the prototype that I have is a single bit sound output that can be used with the little speakers found in PC cases. This will be handy for error beeps that don't interfere with music playing out the stereo jacks at the same time, for example.

Finally, the last item on the first board is the keyboard interface. It uses a 74299 chip (8 bit bidirectional shift/storage register) and a pair of 7474's (flip-flops) to clock in data from the keyboard. It is a very simple design, fed from a timer output on the MC68901, but I am not familiar enough with the difference between XT and AT keyboards to know if it would work with the latter. While I do not believe that XT keyboards will cease to be available, and most of the fancier (and more expensive) keyboards do have XT modes, there is something to be said for flexibility. Should someone want or need the option, having the capability of using an AT keyboard should be available.

The I/O board, as the second board is commonly called, has three more serial ports, an 8-bit joystick port, stereo sound I/O, two parallel ports, SCSI port, a real time clock, and two SIMM sockets for additional RAM.

The first serial port is another MC68901, with transmit, receive, CD, and DTR signals. This time the RTS signal is tied through a resistor to the +12v connection from the bus, necessary in case the device must see it. This port also has a DB9 connector on the board, and is driven by a MAX233 chip.

The other two serial ports, T3 and T4, are controlled by a MC68681 chip which supplies the transmit, receive, RTS, CTS, CD, and DTR signals to two 8 pin headers. These are connected to optional daughter boards that use a MC145407 to buffer all six lines. For talking to a modem or other device that needs both status and

handshaking signals, these are the ports to use. While these ports still don't have all the signals that a PC computer does, such as the ring indicator and high speed sense, they will work for almost anything you need to do. Except for the lack of a DSR signal, these ports are equivalent to the CoCo's ACIA interface.

The joystick interface steals the two 8-bit A/D converters to read its X/Y coordinates. It does this by switching the input from sound to joystick via a 4053 analog switch chip. This is similar to the way that the CoCo worked, except that the A/D chip converts the reading in one step instead of being software driven. The other difference is that there is only one joystick port - two player games are out of the question. The two button inputs are brought into spare ports on the MC68901.

The stereo sound is accomplished via two AD7569 chips, which are A/D and D/A converters in one. They are 8 bit, giving 256 steps of resolution, and are fed by a 4 mhz clock. I'm afraid I don't have the specs on these chips yet, but if you do, you can figure the sample rate from that. The outputs are tied straight to a 5 pin DIN connector, while the inputs are switched as I told above.

The two parallel ports are controlled by a MC68230, which basically has two 8 bit I/O ports with handshaking, plus some timer-counters. The I/O ports are tied each to a 20 pin header, which has grounds along one side, then STROBE, 8 data lines, and ACK along the other. These ports are what is considered "Centronics" compatible, but that is an old standard that has been added to since. The current standard, as it exists on PC computers, involves seven more signals. There is a BUSY signal to prevent output while the printer is not ready, an OUT OF PAPER signal, SELECT to indicate that the printer is online, AUTO FEED used to tell the printer to LF with every CR, ERROR (obvious), RESET for the computer to reset the printer, and SELECT IN to read data in from other devices, such as scanners. Although the MM1 will successfully talk to most printers, there are some drawbacks to not supporting these extra signals. The MM1 must send a data byte out before it knows if the printer is ready to accept data - and then it only knows there is a problem when it decides it isn't going to get an answer after so long. While AUTO FEED is not really that useful (and not used anymore), the BUSY signal prevents waiting for the printer if a problem exists, the other error indications help to prompt the operator to correct the problem, and the SELECT IN allows the use of bidirectional devices available for the PC's and other computers, such as scanners and

ethernet adapters. But even though the designer of the MM1 did not see this as a problem, there is a solution available. Without requiring any changes on the board itself, it is possible to utilize both ports on the MC68230 chip to create one PC compatible port. This can be done simply by creating a custom cable to fit the existing connections and writing a special driver. I am sure that this will become available before long, because if nobody else does it I will. I want to be able to utilize these parallel port to ethernet adapters. Actually, I find it curious that after talking up standards so much IMS didn't follow suit on this one. Especially when I know of another 68k computer using the exact same chip to drive one PC compatible port.

The SCSI port is controlled by a WD33C93 chip, which has a max transfer rate of 4 meg per second. The interface design is very competent except for one thing: current SCSI specs call for resistor pull-up only, rather than the older 330/220 ohm up and down method. This may cause some problems with longer cable lengths and certain devices. The existing resistor packs can be replaced (they are soldered in) if necessary, but it would be nice if IMS either conformed to the current standard or socketed the resistor packs. There is termination power supplied to the SCSI bus through a diode, which is the proper method. And there is a SCSI BUSY led hookup, although it will light for any active SCSI device, not just the first hard drive.

The Real Time Clock is a DS1287 module, which keeps the date, time, and 56 bytes of storage active with an internal battery. Should the unit fail or the battery run down, it would be necessary to replace the entire unit, which is soldered in.

There are two SIMM (single inline memory module) sockets on the I/O board for additional system RAM. Each can accommodate 1 meg by 8 bit or 4 meg by 8 bit modules, which totals to an additional 2 or 8 meg of memory. This memory, unlike that on the main board, is not controlled by the VSC (video display) chip. This means that the processor can use it without having to wait on the VSC to be free of it, and also that the VSC cannot use it for video memory. With no SIMM modules installed, the 1 meg of memory on the main board is shared by both the VSC and the CPU. With additional memory installed, OSK uses the first meg only for video displays, and the rest for processing, which makes the system run faster. Just how fast will be discussed at a later date when I start running tests between the various machines available.

The MM1 bus that connects the two boards is, to my knowledge, not compatible with any existing bus standards. However, all the necessary signals are available for interfacing to most any peripheral. The connection is a 64 pin dual header, with the following pinout:

PIN	DESCRIPTION
1	GND
2	GND
3-18	D0-D15
19	-UDS
20	-LDS
21	R/-W
22	-DTACK
23	CPUCLK
24	-RESET
25	-IRQ4
26	-NMI
27	-AS
28	-BG
29	-BR
30	-BGACK
31	-REQ1
32	-ACK1
33	-REQ2
34	-DONE
35	-IRQ2
36	-DRAM
37-59	A23-A1
60	-OFFCARD
61-62	+5V
63	+12V
64	-12V

All of these signals are tied directly to the SCC68070 processor chip, with the exception of -OFFCARD which comes from address decoding circuitry and is used by the I/O board. A complete description of their functions can be found in the Signetics manual on the chip.

One thing I find interesting, though, is how IMS has claimed they have a 32 bit data bus when in fact there is only 16 data lines available. While they could multiplex the data bus to allow 32 bit transfers, that would require extra circuitry and would not be as fast.

## FINAL WORD

All things considered, IMS has a very powerful machine here. There are a few problems that can either be worked around or fixed without too much effort, but nothing terribly wrong with the unit. And it has a lot of bang for the buck. As an entry level into OSK, or even for somebody who already knows it, this machine will make an excellent choice. That is, when they finish fooling with it and have it completed. Stay tuned for further details...

□

## Paul Ward and IMS

by Scott Grigsby

While I was in Washington D.C., I dropped in on Paul just as he was going out to lunch. We chatted over soup and sandwiches in an ethnic deli just down the street from him. The weather was nice, the service slow, and we covered a lot of interesting topics with only a minor scuffle (fortunately in a foreign tongue) to interrupt us.

But despite the floor show, it was a very interesting and informative exchange. We discussed where he's going with the MM1, the CD-1 connection he keeps hyping, and the problems he faces, among other things.

The one thing that stands Paul Ward apart from the rest of the crowd is his business level attitude towards the MM1, producing it, and selling it. There are some disadvantages to this: we hackers know from experience that something designed by committee isn't necessarily going to work right (The MM1 has gone through several design changes). You can do a lot of research and spend a lot of money on consultants and end up with a very expensive boat anchor. And more important to the CoCo community is the mistrust that breeds between the hobbyists who use the machine and the executives who got it built. Not only do these two groups communicate using an entirely different form of English, but it is all so seldom that the exec's will make a decision based on bogus information when all they had to do was ask any hacker.

Does IMS suffer from the common malady of overdoing the business end of it? Yes and No. I've heard of and even seen a few examples of money spent on consultants who knew less than the average 16 year old computer enthusiast, over-accredited businessmen double-talking the best attendees with high caliber business jargon, and the classic examples of more management than effort. My personal opinion of Mr. Ward himself is that he has spent more time talking up his machine than concentrating on getting it finished. Now that has come in handy in a few instances - he has swung some amazing deals (such as the one with Microware). But this will all be for naught if he doesn't get his act together.

So when, if at all, will Paul and friends get the machine done? At the rate things are going, I would have to estimate that he might have it done by the end of this year, but I'm not holding my breath. And by done I mean completely done and ready for sale to the average consumer, not just developers and CoCo enthusiasts who

already know about OS9 and CoCo Windows. Done means a finished product with a complete set of documentation and all the necessary pieces (Windows, driver modules, and some basic applications) fully debugged and working.

But will he get the job done right, or even at all? Yes, I've seen the good side of his operation too. He has put the hackers and expert hobbyists to work designing the core of the machine. IMS has, as of 91/06/03 shipped 11 units in kit form (though these are single board only) to actual consumers.

And another thing we have to consider is that Paul is really thinking ahead about the MM1 - although sometimes too much so. He says that he has learned his lesson (we hope!) about announcing things before they're ready. Although this is something one would expect from the kind of dreamer it takes to pull this sort of thing off, it distinctly clashes with his business image. Even the average computer enthusiast is taken back by the onset of great ideas never accomplished after a while. But all of these problems are really just symptoms of an even worse malady - he believes in what he is doing. I say 'worse' because he is one of those few who dare to dream of what might be, and work fervently towards making that dream come true. It's the same disease that many inventors have had, and is the source of their perpetual supply of energy. Whether they succeed or not though is determined by how they manage and focus that energy.

Paul has a rare talent. One that most don't realize, and few appreciate. He has the business savvy that is required to make a go of a project like this, yet is working with and for the hobbyists. Think about it - all of the big brand name computer systems around today may have been designed by a few hackers, but the projects have always been directed by big business. Even the beginnings of the Apple show the importance of two diverse people - the hacker who originated the concept, and the businessman who made the contacts, got it built, and sold it. And even these two didn't get along very well. As much as we hobbyists of the world despise the business people muddling in our domain, it's a necessary evil if we are to have these new computers we dream about.

The funny thing about Paul is that he is a bridge between the hobbyist domain and the business world. He's designed a computer that fits the needs of both, and he's got the business savvy to sell it in either. But, he's not perfect.

His biggest mistake has undoubtedly been announcing a date (several times even!) when the MM1 would be available, and then not being able to produce. This has cost the OS9 community a large number of members. People who believed in him but grew tired of broken promises have gone to the PC world and will likely never come back. The only hope I have is that the damage he has done will be offset in the years to come by new people, both hobbyists and business level interest that he is working to attract to OS9. Sometimes I wonder if that's all he does - go around trying to sell this machine that isn't even ready yet. Considering where we OS9er's were headed before he showed up (or rather, introduced his system), we actually may end up the better for having put up with him. But one would have a hard time arguing for that point given the situation right now.

But this bad habit of announcing things before they're ready may just be a sign of this same malady I spoke of earlier. He's dedicated to his project - more so than what would be normal for the average suit on the street. I think that it's easier to think of him as a suit that caught the OS9 bug - something quite rare. And he has adopted the mission of infecting the business world, as well as colleges, computer users, and other hobbyists with that same bug.

But while he is busy doing all that, the largest existing group of people both interested and willing to buy one of his machines has become tired of waiting. So much so that people are cancelling orders. That is, if they can get ahold of Paul to do so.

So will Mr. Ward get his act together? I can only hope that after reading this he comes to the realization of what is really doing to us. I'm not saying that he's not trying, just that he's not always putting his money and effort into what is necessary to get this machine of his ready before there's nobody left to sell it to.

But let's hope for the best... □



# Rainbowfest '91

by Scott Griesenstroog

April 26-28 saw the repeat of a yearly tradition at the Hyatt in Schaumburg, Illinois. A large throng of people gather just before the opening of the Rainbowfest, eager to see, hear, and buy what's new for the CoCo. And over the past few years, OS9 has taken over more and more of the show. What I chronicle in these paragraphs is my experiences while surviving (barely) the three day ordeal.

I arrived plenty early Friday afternoon with Bug (alias Chris Swincerth) tagging along. The plan was to get there soon enough to avoid waiting in line for a ticket. When it came time to line up (usually one hour before the show opens), the first thing I noticed was the lack of people milling about. At first I was really worried that I was in the wrong place at the wrong time, but soon enough some familiar faces started drifting in.

There is a critical mass at which CoCo enthusiasts will break down and start chatting between themselves - regardless of whether or not they know each other. A couple in line behind me could not stop praising the old CoCo, saying they "would sooner get rid of the PC than the CoCo". Their reasoning included its reliability, simplicity, and that they prefer CoCo software such as Dynacalc over similar PC products.

I also discovered that sometimes CoCo3 problems can be caused by a phenomenon called the "walking gimi chip". As the CoCo3 is turned on and off it heats up and cools off causing the chip to creep out of its socket. The simple fix is: take the cover off and press it back down. New one on me!

Even with 20 minutes before opening the line only extended halfway down the hall. I can recall previous fests where it went down the hall and around the corner - at an hour before the show started. I began to wonder if there would be even half as many people at this fest as last year, or if everybody just got smart and waited until after it started to get their tickets...

## AND THEY'RE OFF!

Going around the booths in no particular order, I took note of who had what:

Frank Hogg was (of course) showing the TC70 and TC9 boards, as well as some new additions to his lineup. The 68K drop into a PC board and the MAC OSK port from Gibbs Labs were showing at his (rather large and busy) booth too. For software Frank was peddling Wiz, Dynaspell, 5809 and 68K versions of SuperSleuth (a disassembler),

Shellmate, MV Canvas, and the entire TOP disk set for \$30.

Radio Shack, taking up a fifth of the floor space this year, had CoCo3's at \$80, OS9 Lv2 at \$40, and lots of spare OS9 software for 5 and 10 bucks. Near the end of the last day, the CoCo3's got down to \$60!

Delmar was showing their System 4, and flaunting (rightly so) that they were available now, and that customers get full schematics to the unit. A new product being showed was an OS9 6809 emulator for OSK by Bob Santy. This program allows you to run almost all OS9 6809 programs on your OSK machine!

Sundog Systems had their usual large selection of RSDOS games, and were showing off the new OS9 port of the game 'Kyuma-Gai to be Ninja'. At the end of the fest the guys told me that it sold well enough to encourage them to port other game programs to OS9...

At the Second City booth, Mike Knudsen talked about being nearly finished with the port of Ultimac, his phenomenal music editor, to the MM1. Also announced was a low cost OS9 Lv2 Desk Top Publisher, NewsPaper-09, which should be available by now. They are also working on ports of KBCom, APBBS, and Shellmate (an OS9 file manager) to MM1. Second City is moving to Greensboro NC, and changing their name to KALA software - K Soft for short.

CoCoPro had various hardware upgrades available including the 1 meg boards, Super Controller 2, 4 in 1 board (Scsi, Parallel, Serial), and an Eeprom programmer. They are hot on OSK, planning to come out with six new OSK products shortly.

Spectrosystems had a novel idea - an 'OS9 Smart Watch'. It is a real time clock that fits in your disk controller or rs232 or other rom socket. It comes with an OS9 driver and built-in battery for \$30.

Granite Computer Systems had an array of Zoom modems for sale, including 2400 MNP and a demo of a new unit that will do 12000 baud! Also available were the GCS file transfer utilities for OS9 and OSK to transfer to, from, and between MSDOS, RSDOS, Flex, MiniFlex, and Forth. I found it interesting that these utilities were actually written using OSK and then ported back to OS9.

And last but not least, Burke and Burke had their usual hard drives and utilities, plus a driver for a hand scanner in OS9 Lv2!

## OBSERVATIONS:

- 1) The Atlanta fest was approximately the same size, but was noticeably busier.
- 2) At Atlanta, people surrounded the IMS booth. (Frank Hogg didn't have any TC70 or TC9 boards working).
- 3) At Rainbowfest, people surrounded Frank Hogg's booth at least as much (Frank had already been shipping TC70's, Paul distributed a few at the show).
- 4) The one outfit that had machines ready to buy (Delmar) didn't have the same level of crowds, but did keep busy.

## THE CONFERENCES:

Mike Knudsen on Music & Midi

Mike showed us (or tried to) the advantage of running OS9. Although he had a problem with loading the necessary software, he spoke to us about his planned demo anyway. The idea is to be able to use a synthesizer programming librarian (a piece of software that reprograms the synthesizer for specific sounds) to adjust the synthesizer while playing a tune from another window running Ultimac.

Kevin Darling

The usual conference with Kevin Darling was so long (I missed part of it and haven't had time to review the tape) and so full of really interesting information that I will devote an entire article to it in next month's magazine. Covered subjects include: the demise of the OS9 user's group, the OS9 Lv2 Upgrade, and hidden OS9 applications.

## THE ED, FRANK, AND PAUL SHOW

The big cheeses had a chance to slug it out again this year. Lonnie Falk (the Rainbow's editor) had the three challengers draw straws for the order of their initial five minute presentation. Afterwards there was a question and answer session, not only for the audience but between themselves.

Ed Getsick, who went first, was very clear and concise in reviewing his company's background and his machine. He gave a detailed description of the machine as well as the reasoning behind using a PC bus - inexpensive expansion cards available now. He considers himself the 'new kid on the OS9 block', even though he has been in business since '75. He has been a Radio Shack dealer, and a Unix dealer. The System 4 board, built by Peripheral Technologies, is based on the old K-2 board. It was redesigned for low noise and 4 meg. He listed existing customers of the System 4, including the Department of Agriculture, the FCC,

Rutgers, DePont, Phillips, Raytheon, and many others.

Paul Ward decided to turn his time over to Lee Taylor, a unix consultant recently hired by IMS. But not before listing Lee's degrees: a Masters in Computer Science, an MBA, Masters in Industrial Engineering and Operations Research, and a Bachelor's in Engineering. I personally had difficulty keeping myself from breaking out in laughter during Lee's speech. Rather than tell you why, I've included that convoluted discussion practically word for word so you can see for yourself. Maybe somebody can translate it for me?

"What I want to talk about is some of the issues that have come up that have been really focused on products and I think part of the thing that we need to look at is that everybody's lived through the evolution of the color computer and seen both the positives and the negatives as it becomes mainstream. How do you in your next purchase do you keep the strengths but don't get yourself boxed in a corner again? I think that really makes a point that the decision that people are looking at is where do I go from the color computer today as the next step is not just a product decision but really a technology and a architecture decision as far as what things should I do that will insure that you stay in the mainstream of functionality not necessary the mainstream of mass marketing which may be mados. The thing that excited me about the color computer and the things that Paul has done and the things that the other people are doing here is that under the cover of the machine is this small multi-user multi-tasking operating system that's realtime, well, unix does two of those things it's multiuser and multitasking but it's certainly not realtime although people are trying to retrofit that on there at the expense of making it even bigger. The trick is to take these strengths and attributes that people have used, the realtime, the multiuser, the multitasking, and get those in an architecture that you can forward to the areas of multimedia, hypermedia, what a lot of people are calling ubiquitous computing, which is the everpresent computing, the fact that you've got this information access device that's with you and that's multimodal and that has multiple levels of connectivity to always get you to the information that you need. The trick is to do those things in an environment that also reflects as you've got distributed computing and cooperative computing, your computer is not ... [he is told he is out of time here- thank god]. The thing that I would ask people to think about is technology versus just a product.

Frank Hogg, in his usual way, talked about the beginnings of his interest in OS9. He

claims (and rightly so) to be the "oldest supporter of OS9" around. Another quote I liked was "it's nice to see finally that some other people are coming in and building on the foundation that we built, and hopefully bringing more software to OSK. It's also interesting to note that probably the bulk of the software available today was either developed on a QT or Hazelwood based computer, and very little of it on anything else." And he's actually quite right. He also mentioned a recent sale of a TC70 going over to Kuwait to do acquisitions and supply for a company that's helping to put out the oil fires.

## THE FREE FOR ALL

[the following is selections from my notes covering the highlights of the next 90 mins.]

Lonnice: Tell me what the least cost unit is and what you get for it?

Paul: Right now what we are shipping out is the MM1 kit, comes w/1mg, 2scr, 2par, rtc, stereo sound, mouse & joystick ports, acsi, OS9 68k 2.4, C, Basic, PC file mgr, tape backup, uMacs, proff, graphics editor, lots of utils. 68070 15mhz, VSC, \$875 to \$949. Lowest cost system after FCC approval will be \$799 for single board.

Frank: We have 5 diff systems : lowest cost is TC9, 549.95, 512k ram, OS9 boot, use existing hardware.

Ed: 999 for serial system w/OSK. 4scr, 2par, floppy, 16 mhz.

Lonnice: What will it run?

Ed: Sys4 runs OSK, will release m6809 emulator, runs OS9 lv2 modules. Can't run all OS9 lv2 modules. Also have prototype Alt86 board to run mados on machine. In near future will have PT-Basic that implements RS Basic commands.

Frank: TC9 is only one that will run all CoCo software. Has 68k board that runs in PC. Also has MAC port of OS9.

Paul: Source code compatibility is important. The windowing structure is very similar. If you have Basic09 source code it will probably compile and run with few changes. OSK v2.4. We have exclusive contract for QuickBasic to allow you to run PC basic programs under OSK. Doesn't want to have MSDOS running directly on machine because it will take business away from OSK developers.

Lonnice: I walk up to you today with my checkbook and say I want to buy this machine, when will you deliver it to me finished so all I gotta do is plug it in and make it work?

Paul: "Okay, that's an excellent question. Let me make a couple of points about IMS. When we found out the color computer was

going to be discontinued, we took a look at what putting out another system would entail. And how it could be made successful to the point where we could keep our community together. We took a look at the size of the marketplace that ... [and several minutes later, after harping on importance of FCC approval] - Now, to answer the specific question that you asked, I cannot tell you because it's in the hands of the FCC."

Frank: The TC70 has been shipping since December [31st]. The TC9 is in production now.

Ed: "If you walk up with a check for a thousand dollars we will deliver your System 4 in three weeks."

Lonnice: When we receive working computers from these or other companies there will be a review in Rainbow magazine. September issue maybe for info.

Ed: Rainbow has had a System 4 since November.

Audience: What does your machine offer now that is better than CoCo - why change?

Ed: Speed, expandability, hi rez graphics.

Frank: TC9 is a coco, better hw. Adding 68k processor will be 'fun' for hobbyists.

Paul: "Need to give some time for things to happen. If you want everything right now you are going to be disappointed." Speed, expandability, mem expand, dma capability, supports 1.4 meg floppy. 3 button mouse. 8 bit joystick. 16.7 mil color palette - natural image graphics. Decode RLE graphics in VSC chip. Using terminals is easier. More users. PC interface, networking. Stereo sound i/o. All these extras allow developers to make fancier programs.

Question: Memory limitations - does anybody have desktop publisher coming out-about when.

Frank: Wants compatible, transportable software, is trying to say that dtp would not run well in multi-user environment. Hopefully we will get these programs - but they are very large and complex.

Ed: Doesn't expect to see a DTP for OSK for a long time. There is a low cost package under MSDOS for \$100. Problems you face are that you can do certain things in OSK but you don't have the serious software. Our solution is the MSDOS board for the general purpose software.

Paul: In the short term a DTP is not in the plan. We have built in the capabilities needed for it. Said "learned lesson about announcing things too far in advanced".

*continued on page 15*



[Editor's Note: In place of our regular gripe section we have an article written by a 'wuz' CoCo Enthusiast. While I don't personally agree with his conclusions, he does make some valid points. I offered the big three a chance to add their own views, and have included what I received.]

## Why the "CoCo 4" Will Fail

by Jim Hutchins

Let me begin this article by saying that I hope with all my heart that one, or all of the emerging 680x0 machines succeeds. This, has not, however, clouded my vision in realizing that they will not likely succeed. There are several reasons I believe the "CoCo 4's" will fail.

The first, and most important is the lack of software. It has often been said that it is amazing to see an operating system (OS9) with so many utilities, and so few applications. At present, there is no word processor for OS9 which will hold a candle to most PC word processors. The few word processors available for OS9 have less features and power than most \$10 PC word processors available at departments. OS9 has only one viable spreadsheet, Dynacalc. Though powerful it costs \$99.95 at Radio Shack. For \$12.99, a PC spreadsheet which is more powerful (more rows/columns, faster calculations) can be purchased. The only graphics packages available for OS9 are Deskmate (A Joke), Radio Shack's Program (A Joke), and MV Canvas (A good program, but lacking a few features and much speed). Again, the PC world beats OS9 hands down. Most mice come with free painting software which is as good or better than MV Canvas.

Another major failing for OS9 is its GUI (Graphical User Interface). OS9 is a windowing environment inherently, yet OS9's equivalent to Microsoft Windows is laughable. The speed, the graphics, and the overall quality of Multi-View don't even come close to MS Windows.

The next problem the "CoCo 4 market faces is the cost of the hardware. First, I must interject that, in my experience, no one who would buy a 680x0 machine would be willing to run it on just a floppy. For this reason, I will call the base "CoCo 4", a system with at least one floppy, and a 40 meg hard drive. For an example, I will use the least expensive "CoCo 4" yet announced, the MM/1. Frank Hogg, the maker of the Tomcat, has already said several times that his is a bus system and will remain more expensive, and more flexible than a non-bus system. A third system is the Gibbs Labs 68K board which fits in a PC. Its starting price is \$1995,

therefor making it also more expensive than the MM/1. These three are as yet, the only systems attempting to become the "CoCo 4". To get a MM/1 with 1 Meg of RAM, a keyboard, a 1.44 Meg floppy, a hard disk controller, and video circuitry (along with various other ports) it will cost about \$1300. To get a similarly equipped IBM AT clone, it will cost \$999 from most electronics stores.

There are many good things about an OS9 system. There is multitasking, low overhead, excellent compatibility among different hardware to name just a few. The problem with all this is PC's are catching up. Microsoft Windows offers multitasking and windows. RAM prices are low now, so overhead is a minor problem. For almost every purpose, a PC will serve the average user better. For those who don't know multitasking, they won't miss it. I never did until I switched from RSDOS to OS9.

For most, if not all users, there are two questions which push aside the rest. These are "How much?", and "What software is there." As long as the OS9 community has to answer "A lot", and "Uh, Um, there isn't much" to those questions, it will be left behind. As long as it is behind, there will be few authors who strive to create good software. Writing for an "orphan computer" is like designing cars which get two miles/gallon in the height of the oil crisis, there is no money there.

As long as these deficiencies remain, I see no way for the "CoCo 4's" to thrive. As I said in the beginning of this article, I hope the "CoCo 4" prospers, but I'm not holding my breath.

## Rebuttal #1

by Paul Ward

Jim is absolutely right that OS9 lacks software comparable to what is available in the PC market. Two business questions Jim has failed to ask are (1) Is the MM/1 going after the vast consumer market right now? and if not, is the software available for the MM/1 sufficient for it to sell well to the markets it has chosen? and (2) What are the essential factors in helping to overcome the software gap?

Here are the answers: the MM/1, driven by Interactive Media Systems, Inc., is being targeted to three different target markets in the short term. The first is higher education (multimedia research and data acquisition for now); the second is industrial (software development and real-time applications); and the third is the Color Computer market.

IMS will have over sixty developers in place by the end of June (not to count independent

development) who will be coordinated into groups that focus on these three target markets. Much of the software that exists for OSK can be sold to these markets, and these markets really need very little that doesn't already exist for OSK. The challenge for IMS is basically arriving at well-tuned solutions for each based on a combination of existing software and new software created by our developers association.

Jim also makes the assumption that one must be able to compete head-to-head with the PC world in order to succeed. Not at all! Look at the Amiga. It took years for it to get good software. It's still around because of some strong believers who preferred its multitasking and fun built-in graphics.

Now, with Commodore more aggressively pushing its technology, the Amiga owners have carved a neat, clean niche that is solid and growing in the United States (the Amiga has always done better in Europe).

Keep in mind, too, that PC mania is on the decline. Microsoft and IBM are losing market share to Macintosh and UNIX boxes, especially in certain businesses where desktop publishing, visualization, work groups, and networking are especially demanding. Both IBM and Microsoft stock is performing under par.

Part of the reason that existing OS-9/6809 software does not hold a candle to PC software is that it does not pay to write a whiz-bang CoCo program. The total size of the market you can reach in Rainbow is far less than you can reach in a PC magazine, and the "price-point" for a PC program can be higher. Windows for the PC costs \$99 -- a bargain (except that it works poorly), while Multivue for the CoCo cost, I think, around \$79. Not much difference, except when you look at gross revenues.

So where is the money incentive? The answer to this problem is two-fold: IMS must get its installed base of OSK users as high as possible as fast as possible, and it must charge more than \$9.00 for a game.

Last to note here: In the PC world, you can buy any one of two hundred word processors. How is that choice truly different than having a choice of one of THREE excellent word processors? As long as they get the job done, you're fine. So the "critical mass" of good software is really rather small. There's no need to criticize the OSK community yet -- of course, if we don't have three good word processors by this time next year, complain away.

The price of the hard disk MM/1 system that Jim discusses is \$1475. Of course, what we

are offering should not be considered against an AT clone.

First, no one even considering a PC should consider anything less than a 386SX because this is the least expensive architecture for linear address space and multitasking. NO ONE should buy an AT.

Next, the MM/1 comes with a C compiler free, so you can now add at least \$100 to your 386SX price. Oh, and we come with a text editor and formatter that do it all. Add in, say, \$50 to your 386SX price. And the MM/1 comes with a network interface and software -- that ups the 386SX price considerably -- and if you think that you'll not need networking, think again. PC networking is a booming business where you are bound to pay through the nose for hardware, software, and for installation. All you have to do on the MM/1 is buy a cable and a driver (cheap), and plug it in.

And if you still plan on using your Color computer, you'll appreciate the MM/1's ability to read and write PC disks, CoCo disks, and MM/1 disks.

Also, on a PC you often have to buy an adapter card for a mouse (so you won't eat up your PC's precious few serial ports), for a tape drive, and for a hard drive. Save money with the MM/1 because it has a built-in SCSI hard disk host adapter -- you can use it and a simple cable to use up to SEVEN SCSI devices at no extra charge. You're saving money so fast you'll be able to buy that car you wanted!

You won't need to buy a bus-mouse as you might on a PC because the MM/1 has three serial ports standard -- you can expand to up to five for an additional \$100.

Now let's talk multitasking. You can barely do time-slicing (very kludgy) on a 16 MHz 386SX with Windows. DesqView is not any better. Is any of this real-time, and pre-emptive? No. You'll really have to buy a realtime UNIX for your 386SX, and then you'll REALLY see the costs mount.

You can't set up a multiuser system on a PC without spending about \$2000 for a product that hacks up the operating system and brings out several serial ports. What about a compiled BASIC and an assembler? Print spooling software? That will cost extra on a PC (although GWBasic does come with PCs). How much money have you saved with an MM/1? Oh yes, we also include a game and development tools for point-and-click software development.

What about free or almost free software? IMS will be introducing a version of the Microsoft QUICKBasic compiler for OSK this year that will compile and run programs written by PCs and clones in GWBasic, BasicA, MBasic, and QuickBasic. That's a

ton of software. Now sold in the UNIX software that is free -- much of it is for programmers, but more and more free UNIX software is for end users, including utilities that give your dot matrix or non-Postscript printer much of the power of Postscript printers (how much money will THAT save the consumer)?

How about inexpensive MIDI computing? One of the MM/1's serial ports is configurable for MIDI. This year, you'll be able to use a simple add-on and cable to have what is potentially the most powerful MIDI computer ever offered consumers. You should compare the price of MIDI add-on cards for the PC to the MM/1 MIDI solution.

Now, why would anyone buying a PC really WANT multitasking? Aside from the fact that thousands of CoCo OS-9 owners will die before they buy a single-tasking PC, there are trends in the market that indicate that real-time, pre-emptive multitasking will be greatly appreciated by programmers and users. Multimedia is one trend, which Bill Gates at Microsoft has finally realized -- and yet the ability of a DOS-based machine to do multimedia at the general-purpose system level is poor at best. Don't believe me. Ask ANY DOS programmer how easy it would be to write a system level utility that pops up a talking head to tell you that you received electronic mail a few minutes ago on CompuServe.

Another trend is "ubiquitous computing." The ability to have virtually complete access to your home computer (and to other computers) from anywhere is much easier when your home computer is multitasking and multiuser. Sure, there are some kludgy PC solutions such as PC Anywhere, but they tie up the computer.

Another trend is home control. At last the home control market has begun to agree on hi-bandwidth protocols. The National Association of HomeBuilders, Echelon, Toshiba, Motorola, and others have concocted a standard that will likely be widely adopted during the next three years. IMS is building this protocol into their product line so that home control is just another icon on your computer screen. Get real-time multitasking control over your home without disturbing your ordinary work! Try THAT on a PC.

Granted, some of these benefits of IMS' MM/1 are off in the future. But, even NOW, the MM/1 with a hard drive offers more than a 286 or 386 clone. The reason is simple: IMS knew from the beginning that our real competition is NOT any other company going after the CoCo market with a CoCo 4. Our REAL competition is the 286/386 and the Macs. IMS feels obligated to provide a better value.

The flip side of the PC windowing stuff is bad news for IBM and Microsoft. Imagine the state of computing in five years. Every major or minor brand of computer hardware manufacturer will have windowing in a point-and-click environment: UNIX boxes with Motif, PCs with Presentation Manager, NEXT with NEXTStep, the Mac with its windows, the MM/1 with ITS windows. Now, imagine you are a customer. Which of these boxes are easier to use? None.

All of these computers will, at first and even second glance, work about the same. So why buy any one computer over the other? Which does more? Well, PCs don't multitask preemptively nor expand across the home network. Macs don't multitasking preemptively either. You've got to know a lot about UNIX internals to manage the NeXT and UNIX boxes. And none of them allow you to affordably create VHS cassettes of presentations, reports, and homework.

The MM/1 is capable of doing these things. It also uses file formats compatible with those used by the OTHER major computer in everyone's homes in five years: CD-I.

So, multitasking windows just will level the playing field. It does NOT give PCs an advantage. In a way, the PC is simply saying that Apple won the GUI war.

Jim is absolutely right [about author's revenue]. Until the installed base of OSK computers is high, the revenue received by software authors will be low. There are at least two factors that help us out. First, the software WILL be there, and soon. At the Chicago Fest, when we started shipping MM/1s to customers, no less than FIVE products were debuted for the MM/1: send fax, UNIX utilities, Fontasee font editor, Presto Partner, Disk Zapper. Several more were in Beta, including VEd from Bob van der Poel. Also introduced were Paint, Multiview C Graphics libraries, and others. Impending MM/1 support was announced by third-party vendors CoCo Pro, Burke and Burke, HyperTech Software, and others. Second, the people writing for the MM/1 right now are fully prepared for the lean times for a while. IMS also plans other steps that will dramatically increase the installed customer base.

Jim misses several other challenges to the companies offering new computers. These are, in fact, as important to address as the software and hardware issues he has correctly raised.

First, the computer should be available from more than just a mail-order house. IMS will have representatives and retail operations established around the country.

Second, the computer needs software available on more widely-used computers, if

only to get market presence. Look for two major products to come from IMS this year that will give it excellent visibility.

Third, the software and hardware should follow standards as much as possible. In the case of companies such as Apple that can afford to establish its own "standards", this is less of a concern. For the new computers it is vital. The MM/1 uses a variety of standard software at the system level: it reads and writes PC disks, it uses the IFF/CDI graphics standard, it will have a variety of file conversion utilities to ease the porting of software from one format to another. In terms of hardware, the MM/1 uses SCSI, standard PC disks and keyboards, standard mice and monitors, and so on. By following these standards, IMS customers are assured of higher compatibility, cheaper prices, and better warranties.

Fourth, the business needs a plan. IMS has made more progress with OSK in the last year than most OSK companies have made in a decade. That is because an opportunity exists here, and IMS has a plan to take advantage of it. Some of the details are outlined above, but the strength of IMS and the MM/1 is that the plan is being fleshed out carefully and acted on as swiftly as is prudent. None of the computers being offered will survive in the general market without FCC Class B approval. The MM/1 has been in that process since late last summer (still not through, although IMS is not the only company that is experiencing delays -- the FCC is swamped).

None of the computers will survive without software. IMS established its developers association to tackle this. None of the computers will survive without widespread visibility. IMS will have a nationwide rep program in place by early June. None of the computers will survive unless they provide a consistent hardware platform from which to build DIFFERENTIATING software -- that is, it is essential to have built-in to the base unit a standard video architecture, standard networking architecture, standard expansion architecture such as SCSI, and so on. These built-in features make it easy for developers to build the best possible applications that show off what OSK can do -- multimedia, MIDI, multiuser, network transparent windowing across a home or business network. The MM/1 was designed from scratch with all these considerations in mind.

In conclusion, Jim has raised several excellent points. IMS hopes to succeed at first in its selected niches. The MM/1 will succeed in these niches because IMS has a plan that encompasses the issues of software availability and hardware ability. The MM/1 will succeed in a larger market because of its ability to differentiate itself from existing

computers and because of national retail availability.

Naturally, none of this would have been possible without the excellent support of the Color Computer community. For that support and for its patience, IMS is truly grateful.

#### Rebuttal #2

by Ed Grosick

I noticed Mr. Hutchins did not include the SYSTEM IV in his list of computers and I thank him. The SYSTEM IV is not a "CoCo 4", we have never advertised it as such nor do we wish to be known as a "CoCo 4". I first heard the term on either CIS or the Hayes BBS 2 - 3 years ago. At that time it referred to an improved CoCo3 that would run CoCo3 software but with better performance and interface capabilities.

Mr Hutchins article 'Why the "CoCo 4" Will Fail' raises many interesting points which may be valid depending upon perspective and market. He does not disclose the market to which he is referring so I can only assume his reference is the home (consumer) market. Nor does he define 'success'. My definition of 'success' is quite simple - is it profitable. Yes, the SYSTEM IV and DELMAR CO are profitable. And, for what its worth, I like what I'm doing. By inference, Mr. Hutchins implies that support may not be available to buyers in the future. The SYSTEM IV is strong and successful in the commercial market and its' success is not dependent on the consumer market. Commercial sales are profitable and sales to the consumer market are a plus. We have been in business since 1975 and the manufacturer of the SYSTEM IV, Peripheral Technology, has been in business since 1978. The buyer of a SYSTEM IV need not be concerned about support in the future.

None of the above software will work on any of the new machines. Perhaps Mr. Hutchins is under the impression that CoCo software will run on the new 680x0 machines. Not so. (Although Bob Santy has written an M6809 emulator to allow running most OS-9 6809 software on the 680x0 machines.)

There were versions of Dynacalc and Stylograph for OSK but I don't think they're available any longer. Also, the comparison made is between programs written for the CoCo 4 or 5 years ago whereas Microsoft's Windows is new. It requires either EGA or VGA monitors vs the Analog RGB used by the CoCo. Perhaps Mr. Hutchins should look at the graphics available on the SYSTEM IV. Quality is as good as available on a IBM-PC and, except for the high-end 386-486 boxes, faster. A new windowing environment is in the works for OSK which will make Microsoft's Windows performance third rate.

Availability of 'popular' software for OSK is a problem. We do have SMART. This comes from the MS-DOS/UNIX realm and was ported to OSK by Microware. It includes a spread-sheet, word-processor and data-base. It is a little pricey but it is multi-user! There are other data-base programs, editor/ formatter/ word-processors, etc. available and there are programmers working on more 'popular' programs for OSK.

But to get the major software houses to participate, we will need a larger installed base than currently exists. On the other hand, the market for MS-DOS software is becoming saturated (look at the discounts being offered) so maybe some of these houses will start looking at other markets including OSK.

The cost of a SYSTEM IV with a 40 Meg HD, 1 MByte of Memory a floppy, OSK, etc. is \$1363.00. Add \$150 for a keyboard and a VGA 800 x 600 card. Since the SYSTEM IV is a multi-user system Mr. Hutchins needs to add the cost of Xenix to his PC-AT price to be comparable.

We've recognized the software problem so we designed the ALT86 board. This will allow the user access to most all the MS-DOS software out there. Additionally, the user may still run OSK from the serial ports. We have a substantial commercial demand for this and there is a growing segment of the consumer market interested in this capability. Regarding the statement "... a PC will serve the average user better" might be better if Mr. Hutchins had said "Since the average user doesn't know any better, a PC will serve him better".

The SYSTEM IV is 'thriving' quite well. And no, we are not trying to compete with the IBM PC's.

I believe there will be a large consumer market for multi-user systems in the future. Already, many people are purchasing second and third computers for their homes. Based on the complaints I have heard, they bemoan the difficulty of their computers to communicate with each other. Networking and/or UNIX are expensive and too difficult for these people to handle. This is an area that OSK could shine. All we need is a GUI (user friendly plus bells and whistles), more good software and good marketing.

Mr. Hutchins willingness to take the time and make the effort to critique the new machines, suggests he still has not given up on OS9. What we need are suggestions pointing where we might direct our efforts. Yes, we are still floundering seeking our niche in the consumer market. We don't know where it is so instead of telling us what we already know, help us with some positive ideas. □

## Introduction to BASIC09 Cont'd

by Eric Lavinson

### Focus: Introduction to parameter passing

Now that you are familiar with BASIC09, using the editor and command mode I will describe in detail the process of passing parameters and what is going on in the computer's memory when parameters are passed. I will take you from the programming level to the system level to help you understand the processes. There are a few things you must be comfortable with before you will understand the concept of parameter passing.

To the programmer, passing parameters is a method used to get data into a procedure without having the procedure read it from the keyboard or get it from a data file on disk. Parameter passing is available in many different languages, all the way from BASIC09 to Pascal, C and Assembly language.

### The Stack

In order to completely understand the concept of parameter passing, you must first understand what a stack is and how it works. Basically a stack is an area in memory that holds data in a certain sequence. This type of area can be defined in two ways: 1) Stack or 2) Queue. What sets these two apart is that data placed on the stack is the last to come off, which brings us to the term FILO. It means first in, last out. A Queue is exactly opposite. The data that is placed in the queue comes out first, which brings us to the term FIFO which means first in first out. An analogy to the two types of would be this:

A stack is similar to you placing disks on top of each other to store them. When you want a disk to use, you take it from the top of the stack.

A queue is similar to a gum ball machine. When the machine is filled, the first gumballs that enter the machine exits the machine when a coin is inserted.

When used in computers, data is used, whether it is a string type or number, the data can be placed (pushed) on to the stack or taken (popped) from the stack.

The reason why you need (or don't need) to know this information is because it better prepares you for parameter passing, and when you don't get the results you expected, going back to this preliminary definition will help you to see your mistakes if there are any.

Okay you are all stack experts now. The only type of stack used in parameter passing is the standard FILO stack. The FIFO stack or queue is used in timesharing print spoolers and applications that require many processes to share the same printer or terminal. The rest of this column deals with the FILO stack.

### Procedure Terminology

Remember when last month I asked you to enter that program that prints various multiplication results and assigns a result to a boolean variable B? Well while you were typing in that program you may have noticed hexadecimal numbers in the left column. Those numbers are for the BASIC09 program and the RUNB interpreter to know what line you are on. Even though BASIC09 doesn't require line numbers, the system does so it knows where to return to on a LOOP, WHILE or FOR NEXT loop, otherwise it couldn't possibly know where it left off. There is what is called a program counter in BASIC09 and RUNB's stack space. This program counter holds the current number of the line that is being executed. The program counter is held in what is called a register.

A register is a location within the system that holds information based on what is happening now. For instance, your short term memory can be similar to a register. Registers are used all the time, from using the SHELL, to using a BASIC09 procedure to using any program you are running. The registers are the simplest memory storage areas that the microprocessor has. One of the registers is called the PC register. This stands for Program Counter. When a program is executing, this register always contains the current address of where the program is. Even in machine language.

To understand how the PC register works, type in the following BASIC09 program and run it:

To get into the editor type:

```
e test2
```

at the B: prompt.

Remember to enter a space before each line to insert. If you are still not familiar with the commands in BASIC09, refer to last month's article or simply look in your BASIC09 tour guide book. If you would like to order a book, feel free to write me.

Type in the following program:

```
PRINT "Hi, this is line 1."
GOSUB 100
PRINT "Hi, this is line 2."
GOSUB 100
PRINT "Hi, this is line 3."
END
100 PRINT "This is the subroutine."
RETURN
```

While you are in the editor, type L\* without a space before it and this is what you should see:

```
PROCEDURE test2
0000 PRINT "Hi, this is line 1."
0017 GOSUB 100
001B PRINT "Hi, this is line 2."
0032 GOSUB 100
0036 PRINT "Hi, this is line 3."
004D END
004F 100 PRINT "This is a subroutine."
006D RETURN
```

Notice that the line number "100" and the location number of that line in memory are not the same?

Okay, type Q to get back to the BASIC09 command mode and type RUN.

This is what you will see:

```
Hi, this is line 1.
This is a subroutine.
Hi, this is line 2.
This is a subroutine.
Hi, this is line 3.
```

Here is what happens. I will show remarks after each line to illustrate what is going on:

```
0000 PRINT "Hi, this is line 1."
```

BASIC09 prints the message.

```
0017 GOSUB 100
```

001B is pushed onto the stack and program control is sent to line 100.

```
001B PRINT "Hi, this is line 2."
```

BASIC09 prints the message.

```
0032 GOSUB 100
```

0036 is pushed onto the stack and program control is sent to line 100.

```
0036 PRINT "Hi, this is line 3."
```

BASIC09 prints the message.

```
004D END
```

Program stops.

```
004P 100 PRINT "This is a subroutine."
```

BASIC09 prints the message.

```
006D RETURN
```

The first time this RETURN is executed, it POPS the stack and gets the 001B and transfers control back to that line. The second time RETURN is executed, it POPS the stack and gets 0036 and transfers control back to that line.

What happens is this. The first line prints the message "Hi, this is line 1.". The GOSUB command tells BASIC09 to PUSH onto the stack the next executable command's address which in the first case happens to be 001B. Then the GOSUB command transfers control exactly as the GOTO command does, except the GOTO command does not PUSH anything onto the stack. The subroutine then executes at line 100. Whenever a RETURN is seen, it POPS the stack (bringing back the 001B the first GOSUB pushed there), then it transfers control back to the address it popped. Notice that once something is POPPED, it is gone from the stack forever. The same thing happens with the next line except when it gets to the next GOSUB, 0036 is pushed onto the stack.

Type in the next two following procedures:

```
o one
PRINT "Hi, this is procedure 1."
RUN two
PRINT "Hi, back to procedure 1 again."
END
```

Quit then enter the next procedure:

```
o two
PRINT "This is procedure 2!"
END
```

Exit out of the BASIC09 edit mode so that the B: shows. Now type RUN one. What did you see? Was it something like this:

```
Hi, this is procedure 1.
This is procedure 2!
Hi, back to procedure 1 again.
```

What has happened here is exactly what happens in the GOSUB example, but we are at an obvious advantage here for our procedure 2 can use any variable defined in procedure 1, and they are like different variables!

Here is what has happened in detail:

Procedure one ran first. It printed, "Hi, this is procedure 1." then the RUN command executed. Well the RUN command pushes (like to GOSUB command the address of the NEXT line to be executed after the run.) So it pushes a 0020 onto the stack and then transfers control to procedure TWO. When procedure two runs, after it is finished, its parent procedure (the calling procedure) is automatically called back, but the stack is POPPED and 0020 is received from procedure two and sent to procedure one, where it then goes to the next line and prints "Hi, back to procedure 1 again."

### Parameter Passing

Up until now I have prepared you for what comes next, the focus of this column, parameter passing. Kill all procedures in your BASIC09 workspace by getting to the B: prompt and typing:

```
KILL *
```

Enter the following two procedures:

```
o one
DIM X:INTEGER
PRINT "This will demonstrate parameter passing."
X := 14
RUN two (X)
PRINT "X has the value: ";X
END
```

```
o two
PARAM X:INTEGER
```

```
PRINT "This is procedure 2."
```

```
X := X * 2
```

```
END
```

Run the program "one" and notice what prints:

This will demonstrate parameter passing.

This is procedure 2.

X has the value: 28

How could that be? We assigned X to be 14. Here's what happened:

X was assigned the value 14. When the RUN command was executed, it pushed onto the stack the address 0044 cause that is the next executable line after the RUN. But RUN also has formal parameters, that is the X is a formal parameter unlike GOSUB. When RUN has a parameter, it passes the address of where that variable is in memory to the called procedure NOT the actual value that is in the variable. When a variable is passed by address, this is called Passing by Reference. When its value is passed this is called Passing by Value. When a variable is passed by value, the calling procedures manipulations to the variable will not affect the calling procedure, unfortunately BASIC09 only passes by reference unless you specify constants in the formal parameter list. Here the X is passed as 14, but procedure two multiplies it by 2, returning a 28 to procedure one.

Since the RUN command is pushing both the program counter and the address that X is contained in, the called procedure is referencing the SAME X as the calling procedure. The PARAM command works just like the DIM command, allowing you to define a type to the variable, however the PARAM command expects something to be passed to it at runtime.

Since the variables are passed by REFERENCE, there is no need to pass back the address that X is contained in. so, when procedure two terminates, it POPS the program counter off the stack, and the address of X, but only the program counter is used in procedure one to return it back to the line after the RUN two(X).

If the above line RUN two(X) was replaced with RUN two(X+0) then the X would be passed by value, that is instead of the address of X being pushed onto the stack, the actual value of X is pushed, keeping the called program from inadvertently changing the value of X. If the above line RUN two (X+0) was used nothing the change in X in procedure two would not affect the value of X in procedure one, and procedure one would print "X has the value: 14".

Next month I will go in depth about parameter passing, provide some mixed data types and show how useful parameter passing can be. If you have any questions feel free to write me directly. My address is: Color Galaxy Inc., Eric Levinson, 24415 Marquis Ct, Laguna Hills, CA 92653

Also if you would like your questions answered instantly, feel free to call my free BBS at (714) 831-6530 N/B/1, 3/12/24 baud 24 hours.

o

## Snail Trails

by Lorraine Griepstroeg

This column has nothing to do with computers other than being typed on a PC. According to the editor (my son) that's what he wants. He said to talk about anything I was interested in so that's what you'll get.

The first thing is a big WELCOME HOME II to all the men and women who have come back from the gulf war, most particularly PFC Andrew Hobson and my cousin Lt. Col Logan R. Kelly. Next is to send all our thoughts and prayers to everyone still there trying to clean up the mess.

Turn.

Learning to use a computer is not easy for everyone. How do you know when to press ENTER and when it isn't necessary? As a total novice it helps if someone tells me every step and assumes I know nothing at all about how the computer works.

Turn.

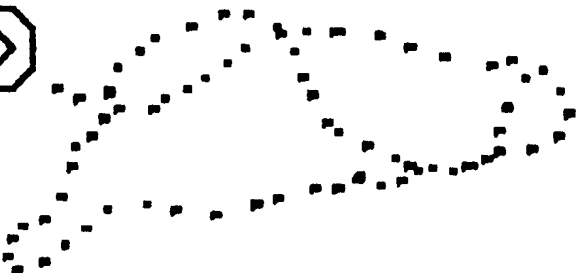
Are any readers Star Trek fans? My strictly personal opinion is that the fourth season of TNG is the best TREK ever. Not that it will ever replace the spot in my heart where the TREK Classic characters reside, but they have had the opportunity to go back and improve on a great show with new ideas and technology. Or 'treknology', to borrow a word from an article about senior illustrator Rick Sternbach in the latest issue of the STAR TREK THE NEXT GENERATION magazine. The first season of TNG wasn't bad but it has been gratifying to watch as the actors fully develop their characters. And the stories have improved each year as well.

Turn.

The month of May is always exciting around here (north-west Indianapolis). This year both of my brothers came for race weekend (about 5 days long), one with his wife and the other with his girlfriend. Add to that my two grown children who live elsewhere, one daughter who still lives with us, and my mother dropping in to see everyone, and the house was very full. The race was very exciting but I was rooting for Emmo and was sorry to see him have trouble before the end of the race. Maybe next year.

Finish.

See you next issue.



## Rainbowfest cont'd ...

Ed: I don't believe we should try to compete with MSDOS. The applications out there are good. We should find a better niche for OSK. I "don't know what it is", but I "don't think people here should sit down and try to write a dtp package".

Dr. Gibbs (in audience): I agree, we shouldn't be trying to beat the game, just join in. We have the multiuser/tasking advantage. OSK can bring less expensive multiuser/tasking than DOS or MAC can. Anything that runs in Unix can be brought over very quickly.

Ed: Need support from Microware on this. Why don't they advertise!! Write letters to Ken Kaplan.

Ed, to Frank: If I buy a TC9 and put a 68k board on it, what does that do for me?

Frank: RGBdos may have support for 68k board. Hopes once out, some people will make use of the board. Under OS9 Lv2, some operations can be speeded up, and some programs can be run on the 68k board.

Frank, to Paul: what about bus interface functionality? What is the cost to expand with a new backplane? [MMI does not have expansion slots].

Paul: \$300?

Frank: How is 32 bit bus expandable with a 16 bit processor? "Expandable, not expandable"

Paul: We're looking down the road. "Frank and I will wrestle afterwards"

Paul, to both: If you had a concept of how our group could work together - what kinds of choices would you guys make that would keep our community together.

Ed: Frank suggested we form a consortium to comprise the 3 and maybe others, plus software people. Wayne Day set up a library on CIS. Frank nor Paul have used it. "The answer is: it's been started, join in".

Paul: I was not clear on what the function was for. Is it just for chatting, or to preview ads so as not to step on each other's toes? I have been really busy.

Ed: "We're all busy, I can't use that as an excuse for my actions." Whatever standards we use we could compromise on. We have a lot of people who want to develop software. Say 15 people develop a particular product. The community is actually harmed by us not talking.

Paul: IDEA group covers that. I think a lot more dialog can go on, it would be really helpful.

Frank, to Lonnie: What is your subscription rate? [of the Rainbow]

Lonnie: There's plenty of market out there.

□